# 1.0 INTRODUCTION

This progress report for the City of San Bernardino Municipal Water Department's (SBMWD) operation and maintenance (O&M) of the Newmark Operable Unit (OU) Interim Remedial Actions (IRAs) covers the reporting period between July 1, 2006 and July 31, 2006. The Newmark OU IRA is being operated to address identified groundwater impacts within the Newmark OU that are part of the Newmark Groundwater Contamination Superfund Site (Site). The IRA system consists of groundwater extraction, granular activated carbon treatment and delivery of potable water to the SBMWD water distribution system.

This progress report has been prepared following the requirements stipulated in the Consent Decree (CD) between the United States Environmental Protection Agency (EPA) and SBMWD, dated March 23, 2005. The requirements of this report are primarily established in the Statement of Work (SOW), which is an attachment to the CD.

## 1.1 Project Background

In 1980, the State of California Department of Health Services discovered and investigated dissolved-phase chlorinated volatile organic compounds (VOCs) contaminants in several municipal water-supply wells within the northern San Benardino/Muscoy region. Following this discovery, several investigations were conducted to identify potential source(s) of the VOC contamination. On March 30, 1989, the United States Environmental Protection Agency (EPA) placed this region on the National Priorities List, releasing federal funds to investigate and clean up the area, now identified as the Newmark Groundwater Contamination Superfund Site (Newmark Superfund Site).

The EPA initiated the Remedial Investigation/Feasibility Study (RI/FS) process for the Newmark Superfund Site in 1990, focusing entirely on the Newmark plume. Earlier investigations indicated that the area contained a second groundwater contamination plume, referred to as the Muscoy plume. Further investigation indicated that both plumes emanate from the same area northwest of the Shandin Hills, suggesting that contaminants contributing to the Newmark and Muscoy plumes have originated from the same source. In 1992, the EPA expanded the Newmark Superfund Site Remedial Investigation to include the Muscoy plume after concluding that the two plumes likely originated from the same source area. A separate OU was designated for each of the plumes, namely, the Newmark OU and the Muscoy OU. The Source OU was added in 1993 as a means to investigate the suspected source area for both plumes.

Separate RI/FS efforts were performed for each of the Newmark OU and Muscoy OU. The RI/FS report for the Newmark OU was finalized in March 1993, and the Record of Decision (ROD) was issued in August 1993. The RI/FS Report for the Muscoy OU was finalized in December 1994, and the ROD was issued in March 1995. An RI/FS has not been completed for the Source OU.

The Source OU/Newmark OU plume is a dissolved phase VOC plume that is approximately 8 miles long from the northwest side of the Source OU to the southern extent at the Newmark

Plume Front extraction well network. The Source OU/Newmark OU plume trends to the southeast from the Source OU, along the north side of the Shandin Hills, and turns to the south beyond the eastern surficial extent of the Shandin Hills. Dissolved-phase VOC contamination within the Newmark OU has caused the closure of a number of San Bernardino municipal wells, and continues to threaten several important supply wells of the City's and neighboring water purveyors. The Source OU/Muscoy OU plume is a similar dissolved-phase VOC plume, which extends approximately 6-miles from the northwest portion of the Source OU, toward the southeast passing the west side of the Shandin Hills, and appears to extend at least to 9$^{th}$ Street in the City of San Bernardino. VOC contamination within the Muscoy OU has also impacted several municipal water-supply wells and continues to threaten additional supply wells. The primary contaminants of concern for both plumes are perchloroethlyene (PCE) and trichloroethylene (TCE).

Based on the findings and decisions presented in the Newmark OU and Muscoy OU RI/FS Reports and RODs, the SBMWD, in conjunction with the EPA, has commenced operations of 13 extraction wells to inhibit further migration of VOC contamination in the Newmark OU and Muscoy OU. The Newmark OU IRA commenced operations in 1998 and was declared operational and functional (O&F) by the EPA on October 1, 2000. The Muscoy OU IRA commenced preliminary operations in March 2005 as part of facilities shakedown, and underwent formal startup testing starting in June 2005. The Muscoy OU IRA is anticipated to be declared O&F by the summer of 2006.

During the operation of the Newmark OU and Muscoy OU IRAs, SBMWD is required to prepare regular progress reports to document O&M activities and compliance with the terms of the CD and SOW. Until such time that the Muscoy OU IRA is declared O&F, the monthly progress report will be limited to reporting Newmark OU IRA O&M activities. When the Muscoy OU IRA is declared O&F, Muscoy OU IRA O&M activities will be added to the progress report.

## 1.2 Facilities Description

This section provides a brief description of the facilities operated by SBMWD under the CD and SOW and for which data are to be reported in these progress report. The locations of the subject facilities are shown in Figure 1-1.

### *1.2.1 Newmark OU Facilities*

Newmark OU extraction systems consist of eight extraction wells split into two separate extraction well networks. The Newmark North extraction well network consists of two EPA-installed extraction wells (EPA006 and EPA007) and one existing SBMWD production well (Newmark No. 3). The extraction well network is located in the northwestern portion of the Newmark OU plume to inhibit further downgradient migration of contaminated groundwater along the north side of the Shandin Hills through a narrow gap between bedrock outcroppings and the San Andreas Fault. Extracted groundwater is treated using seven pairs of 20,000 pound granular activated carbon (GAC) vessels referred to as the Newmark North Treatment Plant. Each pair of GAC vessels is operated in a lead-lag series configuration. The Newmark North

facilities also include five monitoring well clusters (MW-4A/B, MW-7A/B, MW9A/B, MW-16A/B and MW-17A/B) that will be used to monitor water levels and VOCs for evaluating the effectiveness of the Newmark North extraction well network.

The remaining five Newmark OU extraction wells, referred to as the Newmark Plume Front extraction well network (EPA001, EPA002, EPA003, EPA004, and EPA005), are located along the leading edge of the Newmark plume to protect uncontaminated portions of the aquifer (Figure 1-1). Extracted water from EPA002, EPA004 and EPA005 is being treated using eight pairs of 20,000 pound granular GAC vessels located at the Waterman Treatment Plant. Extracted water from EPA003 is being treated using three pairs of 20,000 pound GAC vessels located at the 17th Street Treatment Plant. Extracted water from EPA001, which was initially treated at the Waterman Treatment Plant, is now being treated at the 19th Treatment Plant. Each pair of GAC vessels is operated in a lead-lag series configuration. The Newmark Plume Front facilities also include six monitoring well clusters (MW-10A/B, MW-11A/B/C, MW12A/B, MW-13A/B/C, MW-14A/B and MW-15A/B) that will be used to monitor water levels and VOCs for evaluating the effectiveness of the Newmark Plume Front extraction well network.

### *1.2.2 Muscoy OU Facilities*

An extraction system consisting of five additional extraction wells (EPA108, EPA109, EPA110, EPA111, and EPA112 referred to as the Muscoy Plume extraction well network) has been installed in the downgradient area of the Muscoy OU Plume, and began preliminary operations in April 2005. The Muscoy Plume extraction well network is located upgradient of the leading edge of dissolved VOCs in groundwater to inhibit further migration of VOCs to the south. Extracted water from the five Muscoy OU extraction wells, along with water extracted from EW-1, is being treated using 12 pairs of 30,000 pound granular GAC vessels located at the 19th Street Treatment Plant. Each pair of GAC vessels is operated in a lead-lag series configuration. The Muscoy Plume facilities also include eight monitoring well clusters (MW-128A/B/C, MW-129A/B/C, MW130A/B/C, MW-135A/B/C, MW-136A/B/C, MW-137A/B/C MW-138A/B/C and MW-139A/B/C) that will be used to monitor water levels and VOCs for evaluating the effectiveness of the Muscoy Plume extraction well network. Formal startup testing of the Muscoy Plume extraction well network is underway. The Muscoy Plume extraction well network is anticipated to be declared O&F during the summer of 2006. At such time SBMWD will assume responsibility for O&M under the terms of the CD and SOW.

### *1.2.3 Site Wide-Facilities*

Site-Wide monitoring facilities are included as part of IRA operations to provide additional Site-Wide ground water level monitoring and sampling facilities. The Site-Wide monitoring facilities are used to aid in evaluating the combined effectiveness of the Newmark and Muscoy OUs extraction networks, to provide Site-Wide background ground water elevations, and to evaluate Site-Wide contamination. The 23 Site-Wide monitoring wells are shown on Figure 1-1.

## 1.3 Progress Report Format

This progress report is intended to be used as the instrument for reporting all O&M data required per the terms of the CD and SOW. Until such time as the Muscoy OU IRA is declared O&F, the progress reporting requirements are limited to reporting data for the operation of the Newmark OU facilities. Once the Muscoy OU IRA is declared O&F, the City will begin to report Muscoy OU facility operations in subsequent progress reports.

The report is structured in a modular format to report each type of O&M data in separate sections. Section 2.0 provides the required extraction well operations data. Section 3.0 provides the required treatment plant operations data. Section 4.0 provides the required water level monitoring data. Section 5.0 provides the results of monitoring well sampling. Section 6.0 provides the schedule for upcoming monitoring and maintenance events. Section 7.0 presents a summary of community relations activities.

The reporting requirements for the main data types are as follows:

- Extraction well and plant flows - monthly
- Water levels – quarterly
- Monitoring well sampling – semi-annually (following data validation)

Since reporting of water level data will be limited to four times per year, and reporting of monitoring well sampling will be limited to two times per year, Progress Report Sections 4.0 and 5.0 will often not include data. During these times a brief narrative of the upcoming reporting schedule will be provided and the section numbering structure will be preserved.

The structure of the progress report emphasizes presentation of the required information and data in a tabular format with minimal supporting text. This approach will help to expedite report preparation and agency review. The introduction section is somewhat lengthy to provide ample background information. The text in the remaining sections will be brief.

Since this is the sixteenth progress report submitted under the Consent Decree, and since EPA and DTSC have not commented on the fifteen previous progress reports, the format of the progress report format is considered acceptable to EPA and DTSC. The tables that present data will likely undergo revisions to utilize table templates available within the EQuIS database structure that SBMWD will be using for data management and reporting. At the time of this report, the database systems are still under construction, and therefore were not fully operational during the preparation of this report.

## 1.4 Interim Reporting Approach

During the initial months of CD/SOW implementation, some of the documents that dictate data analysis and reporting requirement will not have been approved by the Lead Oversight Agency and Support Oversight Agency. In specific, the process for evaluating and accepting laboratory analytical data is established in the Quality Assurance/Quality Control (QA/QC) Plan (draft submitted November 21, 2005). The process for evaluating water level data is established in the

Operations Sampling and Analysis Plan (OSAP) (draft submitted on November 8, 2005). During the interim period until these plans are approved by the Lead Oversight Agency and Support Oversight Agency, SBMWD will adopt the following approach:

- Report extraction well and treatment system sampling data following QA/QC procedures currently adopted by the SBMWD for reporting to the California Department of Health Services (DHS) per their DHS permit requirements.
- Report water level data for Newmark OU extraction wells and monitoring wells, and site wide monitoring wells in the form of hydrographs as proposed by SBMWD in correspondence dated April 4, 2005, and agreed to by the EPA in correspondence dated April 6, 2005.

As indicated in the CD/SOW, during the interim period until the Muscoy OU IRA is declared O&F, the City will not be responsible for reporting extraction well flow data, treatment system data, water level monitoring data or monitoring well sampling data for the Muscoy OU facilities in the Progress Reports. These data are being provided to the EPA's contractor separate from the Progress Report in an agreed upon format to facilitate the EPA's evaluation of the Muscoy OU facilities prior to being declared O&F. The EPA has requested the City to include some Muscoy OU monitoring data in the monthly progress reports to create a comprehensive data record in the progress reports. To accommodate this request, the City will append these data to the subsequent progress report upon their receipt in the format in which the data are provided, consistent with the approach documented in SBMWD correspondence dated April 4, 2005. Once the Muscoy OU facilities are declared O&F, the City will begin to analysis and report Muscoy OU IRA operations data in subsequent Progress Reports.

## 1.5 Performance Criteria Compliance Summary

Newmark and Muscoy OU IRA performance criteria are established in the SOW. In summary, the SOW stipulates three sets of criteria that will be evaluated periodically based on data collected during the operation and monitoring of the IRA facilities. The three criteria are identified below and accompanied with a brief description.

### Flow Rate Performance

Compliance with flow rate performance is evaluated by comparing the monthly average flow rate to the established Target Extraction Rate (TER) in place during the reporting period to evaluate whether flow rate performance criteria have been met. The TER for the operation of the IRA facilities includes an adjustment to allow for scheduled and unscheduled maintenance of the extraction and treatment facilities. The TER is adjusted by a maintenance allowance for each extraction well network. The maintenance allowance provides for reductions in the TER for up to 35 days of maintenance per year. The maintenance allowance is to be applied on a three-month rolling average basis, for which the TER for each extraction well network is adjusted downward for the equivalent of 8.75 days of maintenance over the three month period. The initial TER for each extraction well network is based on the Design Extraction Rates presented in the SOW, adjusted for the maintenance allowance and is expressed in the SOW in units of gallons/month.

Under the terms of the Statement of Work, SBMWD is not required to comply with flow rate performance criteria for the Newmark Plume Front extraction well network until the Muscoy OU IRA is declared O&F. At such time the City will begin to calculate three month rolling average flow rates to demonstrate compliance with the flow rate performance criteria established in the SOW. Flow performance for the Newmark North extraction well network is now being monitored and reported in the monthly Progress Reports.

**Flow Performance**

Flow performance criteria have been established in the SOW to evaluate the degree of inhibition that is achieved by the Newmark Plume Front extraction well network and eventually the Muscoy Plume extraction well network, once it is declared O&F. The level of inhibition will be estimated based on water level data collected from wells specified in the SOW. Water level data will be used to estimate the piezometric surface of the contaminated water bearing member, and subsequently used to perform particle tracking analysis. The methodology for calculating the piezometric surface and for performing the particle tracking analysis will be established in the OSAP. Once the OSAP is approved by the Lead and Support Oversight Agencies, the analysis of flow performance will be initiated for the current month's water level data at the time of the OSAP approval. Flow performance particle tracking results will be reported quarterly as part of the quarterly reporting requirement for water level monitoring data.

**Contaminant Performance**

Contaminant performance for the Newmark OU IRA is based on evaluating reported VOC concentrations for groundwater samples collected from monitoring wells located downgradient of the Newmark Plume Front extraction well network (MW 012, MW 013, MW 014 and MW 015). Reported concentrations are compared to criteria established in the SOW, which include contaminant trend criteria and criteria for comparison to drinking water maximum contaminant levels (MCLs). The evaluation of contaminant performance will be performed and reported following the sampling of the identified wells and the validation of the resulting laboratory data. The methodology for evaluating contaminant trends will be established in the OSAP, and will be enacted once the OSAP is approved. The first set of monitoring well samples that will be used to evaluate contaminant performance was collected in November 2005.

**Summary of Compliance**

A summary of compliance with performance criteria for the reporting period is provided in Table 1-1.

## 2.0 EXTRACTION WELL OPERATIONS

Extraction well operations of Newmark OU extraction wells during the reporting period are summarized in a series of tables. A description of routine maintenance performed, problems encountered, process improvements implemented and deviations from the operational requirements of the Consent Decree is provided in Table 2-1 for the Newmark North and Newmark Plume Front extraction well networks. A summary of extraction well flow data and well run times for the reporting period are provided in Table 2-2. A calculation of the three month rolling average extraction rate and comparison to SOW stipulated extraction criteria for the Newmark North extraction well network is provided in Table 2-3. A summary of analytical results for groundwater samples collected from the extraction well sampling ports during the reporting period are provided Table 2-4.

Until the Muscoy OU IRA is declared O&F by the EPA, SBMWD is not required to demonstrate compliance with the extraction rate criteria stipulated in the SOW for the Newmark Plume Front extraction well network. Once the Muscoy OU IRA is declared O&F, a calculation of the three month rolling average for the Newmark Plume Front extraction well network will be added to Table 2-3 with a comparison to extraction rate requirements.

## 3.0 TREATMENT PLANT OPERATIONS

Treatment plant operations for Newmark OU treatment plants for the reporting period are summarized in a series of tables. A description of routine maintenance performed, problems encountered, process improvements implemented and deviations from the operational requirements of the Consent Decree is provided in Table 3-1 for the Newmark North, 17th Street and Waterman treatment plants. A summary of GAC treatment plant flow data and mass removal estimates during the reporting period are provided in Table 3-2. Cumulative mass removal estimates are also provided in Table 3-2. A summary of analytical results for water samples collected from the treatment plants during the reporting period are provided in Table 3-3. Samples included in Table 3-3 are treatment plant influent samples, lead vessel effluent samples and combined lag vessel effluent samples. A copy of the Monthly Summary Treatment Report for submitted to California Department Health Services as part of the City Water Supply Permit (DHS Report) for the reporting period is provided in Appendix A.

It should be noted that the Operations Monthly Treatment Report table included in the DHS Report (Appendix A), shows the monthly volume of water pumped through each of the GAC carbon vessel pairs. In the spreadsheet, all of the treated volume is attributed to the current lead GAC vessel for carbon loading tracking purposes. However, it should be noted that this same volume of water flows through the lag vessel, even though the volume is shown as zero in the spreadsheet.

## 4.0 WATER LEVEL MONITORING

A description of routine maintenance performed, problems encountered, process improvements implemented and deviations from the operational requirements of the Consent Decree during the reporting period are provided in Table 4-1 for the wells included in the SOW specified water level monitoring program. Third Quarter 2006 water level monitoring data will be presented in the form of hydrographs in the September 2006 Progress Report. Each of the hydrographs will include all of the water level data that has been collected since the entry of the Consent Decree on March 23, 2005.

## 5.0 MONITORING WELL SAMPLING

The first monitoring well sampling event was completed in November 2005. This event is a semi-annual monitoring event and is limited to sampling of the wells identified in Section III.D.1 of the SOW. Since the OSAP and QA/QC Plan had not been reviewed by EPA or DTSC at the time of this sampling event, groundwater samples were collected by SBMWD and transferred to URS for shipment to and analysis by EPA's laboratory of choice. Coordination between URS and SBMWD for the collection, transfer and shipment of the groundwater samples was established in the November Sampling Event Coordination Plan submitted to EPA on November 8, 2005 prior to the sampling event. Analytical data from this monitoring event will be reported once validated data has been received from EPA and reviewed by SBMWD.

# 6.0 REMAINING REQUIRED INFORMATION

This section presents the remaining information for the reporting period that is required to be submitted in progress reports per the CD and SOW. The required information includes identification of deliverables submitted during the reporting period, a schedule of upcoming O&M and monitoring events, and a summary of community relations activities.

## 6.1 Schedule of Upcoming Events

A schedule of upcoming events for a two month period beyond the reporting period for this Progress Report is provided in Table 6-1. The table is broken into several components including extraction well monitoring and maintenance, treatment system monitoring and maintenance, monitoring well monitoring and maintenance, project documents, groundwater modeling and community relations.

## 6.2 Deliverables Submitted During The Monitoring Period

Table 6-2 provides a list of deliverables submitted during 2005 and 2006 up to the submittal date of this report.

## 6.3 Groundwater Modeling Activities

A progress summary for development of the Newmark Groundwater Flow Model is provided in Table 6-3. The progress summary includes a brief description of groundwater modeling activities conducted during the reporting period and a brief description of planned groundwater modeling activities to be performed over the next few months.

## 6.4 Community Relations Activities

This section reports community relations activities performed during the reporting period and lists anticipated community relations activities to occur within the next six weeks.

### *6.4.1 Activities Conducted During the Reporting Period*

No community relations activities were conducted during the reporting period.

### *6.4.2 Activities to Be Conducted Over the Following Six Weeks*

Community relations activities planned for the next six weeks are listed in Table 6-1.